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TI - Bolt tightening machine ratchet mechanism - has ratchet arm with socket wound strip socket retention lug, and roller between

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PA - (WAGN-N) WAGNER P H MASCH

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AB - DE2554427 A bolt tightening machine employs a tightening strip which is wound around a socket. One end of the strip is connected to a lever, and its other end has a lug which is retained on the socket by a projection from the lever.

- Between the projection (14) of the lever (11) and the lug (12) on the strip (10) is a pressure piece (15) supported in line by the projection and the lug. The pressure piece is a roller which can roll freely in its location between the lever projection and the strip lug. For position holding purposes, between the pressure piece and the projection, and between the pressure piece and the lug, rollers balls or pins are arranged in recesses.

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##DE2554427 B 19761230

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###\*\*WARNUNG\*\* at the beginning of ##DESC box knew end of ##CLMS ##uberlappen \* \*.

Patent claims:

1. Tool with idle run idle run, with a klemmband re-clamping a sleeve, its one end with a lever in compound is and its other end a beginning exhibits, which is set by a nose of the lever on the sleeve, in the fact characterized that between the nose (14) of the lever (11) and the beginning (12) of the klemmbandes (10) a press piece (15, 21) is arranged, which is almost linienförmig supported at the nose and at the beginning.
2. Tool according to demand 1, thus gekenn draws that the press piece is a rolling member, which unreels practically slide-free at the nose of the lever and at the beginning of the klemmbandes.
3. Tool according to demand 1 or 2, by the fact characterized that between the press piece and the nose and between the press piece and that beginning to the position layer rollers, balls or pins in recesses are arranged.
4. Tool after one of the demands 1 to 3, by the fact characterized that the press piece (15) essentially possesses roller form.
5. Tool after demand 2, thereby gekenn draws that the contact surfaces at the nose and at the beginning, at which the press piece unreels are slightly diagonally posed opposite the axis of the lever, so that the press piece moves with increasing voltage of the lever in the direction of the lever too.
6. Tool according to demand 2, thus gekenn draws that the contact surfaces, with those that Press piece at the nose and at the beginning unreels, different radii exhibit.
7. Tool after one the preceding Demands, thereby characterized that pressure exhibits the piece (of 21) two klingenförmige backs (22, 23), in opposite directions point and at the nose (14) and at the beginning (12) into pointedly approaching hollows (23, 24), of them are inserted Öffnungswinkel more largely are than the wedge angle that Back (22, n').
8. Tool after one the preceding Demands, by the fact characterized that a hydraulic driving device (32) for the lever (11) is intended, which is coaxially to the sleeve (13) supported for mounted fixture (housing 33) at one.
9. Tool after one the preceding Demands, by the fact characterized that the beginning (12) of the klemmbandes carries one on the sleeve (13) influencing wiping off (42).
10. Tool after one the preceding Demands, by the fact characterized that that Klemmband (10) directly solidly with the lever (11) connected or einsteckig with this manufactured is. The invention concerns a tool with idle run idle run, with a klemmband re-clamping a sleeve, whose end with a lever is located in compound and whose other end a beginning exhibits, which is set by a nose of the lever on the sleeve. With a well-known idle run idle run of this kind (##DT-PS 5 83 635 and ##DT-PS 5 83 908) the lever is connected by a hinge with end of the klemmbandes and pushes with a protruding nose against a beginning planned at the other end of the klemmbandes. The klemmband loops the sleeve, which exhibits a hexagonal recess for setting at screws and nuts. If the lever is turned in clamping direction around the screw, then the nose of the lever presses the beginning planned at the end of the klemmbandes almost tangential to the screw, whereby the klemmband becomes strained and it tightens itself at the sleeve. While the turning of the lever the sleeve and the screw head contained by it are thus carried forward and turned by the firmly tightened

klemmband. With the idle run idle runs that part is most strongly stressed, at which the nose of the lever presses against the beginning at the end of the klemmbandes. With increasing spanning these two parts move against each other and rub one on the other. Thus result extremely high surface pressures, which can lead to the fact that the material starts cold-flowing here and itself lasting deformed. This danger consists in particular with hydraulically driven screwing devices. A such screwing device is described the principle after in the ##DL-PS 62,789. This screwing device operates with a ratchet provided with a ##Gesperrrad. The ratchet lever is moved by a hydraulic piston cylinder unit periodically ##hinund, so that the screw head in the direction of rotation is carried forward, while in the other direction of rotation a release takes place. If one wants to replace the well-known ratchet by an idle run idle run, which has the benefit that it operates steplessly, then deformations at the nose of the lever and at the beginning of the klemmbandes occur due to the high forces applied by the hydraulic driving device.

There is wrenches with idle run characteristics well-known, with which free wheel units in the form of balls or rollers are accommodated in a ring surrounding a sleeve. If the ring is turned in the direction, then the balls at slants move along into extended recesses inside, so that they do not attack rubbing against the sleeve.

In the case of a turn in the other direction the balls are clamped against it between the ring and the sleeve, which leads to a taking along of the sleeve (DT ##Gbm 17 15597, ##DT-OS 15 03 109 and ##DT-AS 22 31 385).

When clamping pipes for the purpose of twisting it is well-known, a pipe with a clamping device, which consists of chain links or curved rods to re-clamp. The clamping device exhibits a lever, which pushes away at a press piece pressing against the pipe and which chain tightens ##od. such around the pipe, if it is swivelled around its coupling point. Larger frictions between the tendon re-clamping the pipe and the lever can occur, what can lead to local overstressing and ##Fliesserscheitungen of the material (##US-PS 14 00 398, ##US-PS 15 73 281 and ##US-PS 29 21 489).

During a further well-known clamping fixture for the rotation of pipes the pipe enclosing link chain is intended, at whose an end a swivel lever is linked. The other chain end seizes with a teeth into suitable ##Ausneh ##mungen at the exterior of the clamping lever. The chain end inserted into the clamping lever takes itself off from the pipe, so that a larger part is exposed to the periphery area of the pipe of a radial spanning. The chain teeth are stressed on shearing, what during the transmission of high torques is unfavorable (##FR-PS 6 74 785). With ratchets, into which a cutter head is inserted for the execution of a thread cutting process, is a swivel taking along admits (##DT-AS where 43,030).

Function of the invention is it to train an idle run of the kind initially specified in such a way that it is usable for applying high screwing moments, without the material in the most strongly stressed parts is lasting deformed.

For the solution of this function it is suggested according to invention that between the nose of the lever and the beginning of the klemmbandes a press piece is arranged, which is almost ##linienfoermig supported at the nose and at the beginning.

By mounting and organization of the press piece one achieves that the nose and the beginning do not cooperate directly together rubbing. Between both parts rather the press piece is arranged that at each of the two points of contact only an unreeling or a tilting motion, however no slip motion accomplishes. Likewise high surface pressures result at the narrow bearing surfaces of the press piece and the two lying close components, however with it no additional friction occurs by sliding. The components can consist according to the occurring load out particularly hardened material.

If the nose and the beginning are ##einstueckig with the klemmband, only a limited hardening can be accomplished, because otherwise the elasticity of the klemmbandes was too strongly reduced. For this reason the two parts mentioned at the points of contact with the press piece can tungsten carbide-in-corrode exhibit. In favourable arrangement of the invention are between the press piece and the nose and between the press piece and the beginning to the position fuse rollers, balls or pins in recesses arranged an important benefit consist in the simple and cheap production possibility and when the easy assembling of such press pieces. The press piece is held by the rollers, balls or pins at its place. These components serve only as fuse against out sliding of the press piece.

Normally clamping the idle run takes place via tightening the lever. Since thereby the klemmband stretches, it can be necessary to swivel the lever around a considerable bracket which entails again a strong local bending load of the klemmbandes.

So that clamping klemmbandes already with smaller lever movements takes place, can in further arrangement invention intended to be that the contact surfaces at the nose and at the beginning, at which the press piece unreels are slightly inclined/slanted opposite the axis of the lever, so that the press piece itself with increasing voltage of the lever in the direction of the lever too moved during normally the contact surfaces are accurately vertically to the lever, then now slightly, i.e. are inclined/slanted around some degrees of angle, so that the press piece is moved when clamping the lever by the klemmband, so that stretchingstretching stretching is used completely or to a part by the additional movement of the press piece. With same clamping force in the klemmband the swiveling path of the lever is shortened by the radial component contained in the slants. This permits on the one hand a better utilization of stroke and causes on the other hand a more careful enterprise of the klemmbandes, how is in the following still described.

The same effect can be achieved, if the contact surfaces, with which the press piece at the nose and at the beginning unreels, exhibit different radii. In this way during unreeling the indemnity between the two contact surfaces is increased, which leads likewise to the fact that the angle traverse of the lever can be made smaller with same clamping force.

Alternatively the press piece can exhibit two ##klingenfoermige backs, which are inserted into pointedly approaching hollows at the nose and at the beginning. ##Öffnungswinkel the hollows are larger thereby than the wedge angles of the backs. In this way results knife-edge bearing, which causes high compression stress at the cutting edge points, but however is practically frictionless and no substantial material wear causes.

The press piece according to invention is suitable in particular with an idle run idle run with a hydraulically driven driving device, which is coaxially to the sleeve mounted fixture supported at one. Since with the high occurring pressing powers on the areas of the clamping strap and the sleeve rust-similar deposits can result, which cause the fact that the areas are inclined rather to the food is intended in further arrangement of the invention that the beginning of the klemmbandes runs out pointedly and carries stripper affecting the sleeve. The stripper can be a blade or a soft material, which removes with the rotation of the klemmbandes around the sleeve and any deposits.

Furthermore the invention creates an idle run idle run, with which the klemmband is directly firmly connected with the lever or ##einstueckig manufactured with this.

While with the well-known idle run idle runs the klemmband is connected with the lever always by a hinge, these parts can be manufactured after the invention ##einstueckig, whereby the production and mounting are simplified and the reliability is increased.

The invention is more near described in the following with reference to the figures by some preferential design examples.

Fig. 1 shows a profile by a first execution form of the invention, and Fig. 2 a side view of the idle run idle run ##nachFig. 1, Fig. 3 shows the positions of the lever and the press piece during clamping.

Fig. ##a to ##3d show different press pieces, partially with the associated bearing surfaces,

Fig. 4 shows an execution form of the invention with a prism-similar press piece, and Fig. 5 shows an idle run idle run, which essentially corresponds to that the Fig. 1 and 2, however with a hydraulic drive unit becomes strained.

The tool after ##Fig 1 possesses a flexible klemmband 10 made of metal, which changes end at its into the rigid lever a 11. At the other end of the klemmbandes is thickens trained beginning 12. The klemmband encloses the sleeve 13 almost completely. The sleeve 13 possesses hexagonal a recess to ##setlezan at %

At the connector between the clamping strap 10 and the lever 11 a nose is 14, at that that

Press piece 15 lies close. The press piece supports itself at the other side at the beginning 12 off. The beginning 12 and the nose 14 have two parallel areas, between which the press piece lies. These areas run about vertically to the lever 11.

With the design example the Fig. 1 and 2 consists the press piece 15 of one essentially ##zylindri ##schen roller, which can exhibit disks 16 of increased diameter at its face.

Around inadvertent changes of position of the press piece

15 to prevent, is at the ends that

Tangent lines of the press piece 15 with the nose 14 on the one hand and the beginning 12 on the other hand small

Balls or rollers 17, those into adapted hollows of the

Beginning 12, the nose 14 and the press piece 15 are used. At the tangent lines of the ##Druckstueck of ##kes 15 with the parts 12 and 14 the highest result

Compression stresses. Into the parts of 12 and 14 can be therefore applications 18, 19 made of very hard metal let in, those at the same time the hollows for those

Balls 17 form.

Becomes the lever 11 in accordance with ##Fig.1 toward of the

Arrow 20 turned, then the nose 14 presses against that

Press piece and this press for his part against that

Beginning 12. In this way the free end becomes of the

Clamping strap 10 ##stramm around the sleeve 13 ##herumgewik ##kelt, until the parts of 10 and 13 are with one another in solid friction engagement. While the turning of the lever this carries forward now rigid the unit including the sleeve 13, become, and turns the screw in it. During clamping that rolls

Press piece 15 between the nose 14 and the beginning 12 off.

These conditions are represented in ##Fig.3. In taken off lines thereby the position of the lever is

11 and the press piece 15 in the declamped state shown, while the broken drawn ##Posi represents ##tion the strained state. One recognizes that the roller 15 on the beginning 12 only a relatively short

Piece rolled, while it went along with the nose 14 a relatively large piece. The representation in F i g. 3 is for the illustration of the action principle over floated drawn.

From ##Fig. one recognizes 3 however that the part 45 of the

Klemmbandes the most strongly stressed part is.

Here different bends step and at the same time must the full tensile force be transferred depending upon

##Belastungszu rose. In order to avoid that with a stroke of the tool a excessive angle traverse of the lever 11 must be exceeded, whereby the bend of the klemmbandes in the part became likewise large 45 is in accordance

with F i g. ##a intended that the two contact surfaces 46 and 47 of the

Beginning 12 and/or the nose 14 not accurately right-angled to the direction (relieved) of the lever 11 run, but with easy inclination. Becomes now that

Lever 11 strained, then rolls the roller 15 to a certain extent uphill, by moving toward the lever 11 and thus length stretching wedge tape completely or partially compensates. By this additional course guide of the press piece 15 a shortening the stroke(of stroke) steps a d. h. the lever 11 needs, in order to achieve the same voltage in the klemmband, only around a lower bracket to be swivelled ##ael with not inclined/slanted contact surfaces.

##Es'stuehlig,haSKmmhanh bend, there:

1. Forces, which are required for bending, to clamp turning work without before the klemmband

2. the bend unwanted idle stroke results in, and

3. the danger of fracture is kept small (##Materialer ##muedung).

With the design example after ##Fig.3b are those

Contact surfaces 46 ' and 47 ' curved. They run first about right-angled to the lever 11, around then outward ever more strongly from their original

To deviate direction. Thereby one creates a sliding transition and achieves with more increasingly

Voltage of the lever 11 one ever more strongly becoming

Shortening the stroke(of stroke).

A shortening the stroke(of stroke) can be achieved alternatively or additionally also by the special organization of the press piece. The press piece represented in F i g. ##3c

approximately the form of a flatpressed or cut off walzenkoepers has 48. The roller outline is broken suggested. While the one contact surface

49, which unreels e.g. at the beginning 12, that

Walzenmantel corresponds, has the opposite

Contact surface 50, which unreels e.g. at the nose 14, a larger radius. In this way the beginning 12 and the nose become 14 48 ##aueinanderge of the piece of pressing press, if this is inclined/slanted due to the unreeling

movement. Thus one achieves that likewise

Effect of the shortening the stroke(of stroke), i.e. a ##Auseinanderdruck ##ken from klemmband and lever with increasing

Clamping of the lever 11.

With in Fig. ##3d in the profile illustrated form one

Press piece 51 a rounded off contact surface 52 is intended, while the opposite side is likewise as rounding 54 designed either when point 53 or. Since the unreeling movement stretches itself always only over a relatively small angle of rotation it, the organization is between the two

Contact surfaces of lying parts of the press piece far going indifferently.

With the design example after ##Fig.4 is that

Klemmband 10 together with the lever just as trained as with the ##Ausfueh described before ##rungsbeispiel.

The substantial difference lies in that

Formation of the press piece. This consists of one

Bar 21, whose top and bottom form ##more klingenfoer ##mige backs 22.23. At the beginning 12 and at that Nose 14 are pointedly approaching hollows 23', 24, of them ##Öffnungswinkel more largely are than the wedge angle that

Backs 22, 23. The press piece 21 can in the hollows

23' and 24 tilts. It forms 12 and 14 two knife-edge bearings together with the parts, as they were usual in former times for the bearing of scale beams. For the increase that

Pressure strength are also here applications 22, 25 from very hard material in the parts 12 and 14 intended.

The press piece 21 could be called because of its form clearly visible in ##Fig.3 also piece of prism.

The mounting of a press piece would describe ##nen kind with a klemmbandknarre klemmbandknarre klemmbandknarre permitted only the practical use of the klemmbandknarre klemmbandknarre klemmbandknarre in linkage with a hydraulic drive unit after the system represented in ##Fig.S. The

klemmbandknarre klemmbandknarre klemmbandknarre after Fig. 5 is in principle in the same way built up as that the Fig. 1 and 2. At the free end of the lever 11 the piston rod 31 of a piston cylinder unit 32 attacks over a hinge 30. The cylinder of the piston cylinder unit is linked at the housing 33 working as fixture. At the piston cylinder unit is the control valve 34, which is reversed by the control rod 35. The control rod 35 is connected by a disk 36 with a rail 37, which spread of at the end of the lever 11 attached fork 38 become. At the ends of the rail 37 stop springs 39, 40 arc intended, against which the fork pushes 38 at the end of each flask stroke. If this is the case, then the rail 37 a short piece of the lever 11 is carried forward and moved by it the control rod 35.

This actuates the commutating valve 34, which thereupon the piston motion reverses. By in the wall of the housing 33 planned exzenterbolzen 40 the control rod 35 can be stopped, in order to make the hydraulic driving device ineffective.

Crosswise by the housing 32 a telescopic supporting arm 41 runs for deriving the reaction forces occurring when screwing to a stationary counter bearing.

The housing 33 encloses the sleeve 13 and possesses the same axis of rotation as these. The piston cylinders unit 32 that supports itself for his part over the support 41 is defined off and moves the screw head with each extension of the piston rod 31 at the housing 33. During following drawing in of the piston rod the klemmband 10 is loosened and slides on the sleeve 13 back.

At the pointedly running out beginning 12 of the klemmbandes 10 is a stripper 42, which exceeds over the point of the beginning 12 and wipes off any deposits of the sleeve 13.

#### Patent claims:

1. Tool with idle run idle run, with a klemmband re-clamping a sleeve, its one

End with a lever in compound is and its other end a beginning exhibits, which is set by a nose of the lever on the sleeve, in the fact characterized that between the nose (14) of the lever (11) and the beginning (12) of the klemmbandes (10) a press piece (15, 21) is arranged, which is almost ##linienfoermig supported at the nose and at the beginning.

2. Tool according to demand 1, thus ##gekenn draws that the press piece is a rolling member, which unreels practically slide-free at the nose of the lever and at the beginning of the klemmbandes.

3. Tool according to demand 1 or 2, by the fact characterized that between the press piece and the nose and between the press piece and that

Beginning to the position layer rollers, balls or pins in recesses are arranged.

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5. Tool after demand 2, thereby ##gekenn draws that the contact surfaces at the nose and at the beginning, at which the press piece unreels are slightly diagonally posed opposite the axis of the lever, so that the press piece moves with increasing voltage of the lever in the direction of the lever too.

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Demands, thereby characterized that pressure exhibits the piece (of 21) two ##klingenfoermige backs (22, 23), in opposite directions point and at the nose (14) and at the beginning (12) into pointedly approaching hollows (23, 24), of them are inserted ##Öffnungswinkel more largely are than the wedge angle that Back (22, n').

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Demands, by the fact characterized that a hydraulic driving device (32) for the lever (11) is intended, which is coaxially to the sleeve (13) supported for mounted fixture (housing 33) at one.

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With a well-known idle run idle run of this kind (##DT-PS 5 83 635 and ##DT-PS 5 83 908) the lever is connected by a hinge with end of the klemmbandes and pushes with a protruding nose against a beginning planned at the other end of the klemmbandes. The klemmband loops the sleeve, which exhibits a hexagonal recess for setting at screws and nuts. If the lever is turned in clamping direction around the screw, then the nose of the lever presses the beginning planned at the end of the klemmbandes almost tangential to the screw, whereby the klemmband becomes strained and it tightens itself at the sleeve. While the turning of the lever the sleeve and the screw head contained by it are thus carried forward and turned by the firmly tightened klemmband. With the idle run idle runs that part is most strongly stressed, at which the nose of the lever presses against the beginning at the end of the klemmbandes. With increasing spanning these two parts move against each other and rub one on the other. Thus result extremely high surface pressures, which can lead to the fact that the material starts cold-flowing here and itself lasting deformed. This danger consists in particular with hydraulically driven screwing devices. A such screwing device is described the principle after in the ##DL-PS 62,789. This screwing device operates with a ratchet provided with a ##Gesperrrad. The ratchet lever is moved by a hydraulic piston cylinder unit periodically ##hinund, so that the screw head in the direction of rotation is carried forward, while in the other direction of rotation a release takes place. If one wants to replace the well-known ratchet by an idle run idle run, which has the benefit that it operates steplessly, then deformations at the nose of the lever and at the beginning of the klemmbandes occur due to the high forces applied by the hydraulic driving device.

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